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IS 4014-2 (1967): Code of Practice for Steel Tubular Scaffolding, Part II: Safety Regulations for Scaffolding [CED 29: Construction Management including safety in Construction]



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IS : 4014 (Part II) - 1967

Indian Standard

CODE OF PRACTICE FOR
STEEL TUBULAR SCAFFOLDING

PART II SAFETY REGULATIONS FOR SCAFFOLDING

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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*Indian Standard*CODE OF PRACTICE FOR
STEEL TUBULAR SCAFFOLDING

PART II SAFETY REGULATIONS FOR SCAFFOLDING

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Indian Standard

CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING

PART II SAFETY REGULATIONS FOR SCAFFOLDING

0. FOREWORD

0.1 This Indian Standard (Part II) was adopted by the Indian Standards Institution on 31 March 1967, after the draft finalized by the Structural Engineering Sectional Committee had been approved by the Structural and Metals Division Council and the Civil Engineering Division Council.

0.2 With the heavy construction programme envisaged, the importance of the use of modern scaffolding cannot be over-emphasized. Steel tubular scaffolding is one of the modern types of scaffolding which can be assembled quickly, and transported and handled easily. It can be dismantled rapidly and re-used, and relied upon for long service and life. The Sectional Committee, therefore, felt that a code of practice for steel tubular scaffolding should be formulated.

0.3 In the preparation of this standard, the Sectional Committee kept in view the manufacturing and trade practices followed in the country in this field.

0.4 This code is being published in four parts and is intended to act as a guide for the construction and use of scaffolds and other structures of tubular scaffolding material normally used in construction, maintenance, repair and demolition work, and which enables persons to obtain access to, and to perform work, or which enables materials to be taken to any place at which such work is performed.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This code (Part II) covers safety regulations that shall be observed in the design and construction of scaffolding.

2. PROVISION OF SCAFFOLD AND MEANS OF ACCESS

2.1 Suitable and sufficient scaffold shall be provided for all work that cannot safely be done from the ground or from part of the building, or from part of a permanent structure or from a ladder or other available means of support, and sufficient safe means of access shall as far as reasonably practicable, be provided to every place at which any person has at any time to work.

3. SUPERVISION OF WORK AND INSPECTION OF MATERIEL

3.1 No scaffold shall be erected or be substantially added to or altered or dismantled except under the immediate supervision of a competent person (that is a qualified and authorised safety engineer) and as far as possible by competent workmen possessing adequate experience of such work. All material for any scaffold shall be inspected by a competent person on each occasion before using.

4. MAINTENANCE

4.1 All scaffolds shall be properly maintained and every part shall be kept so fixed, secured or placed in a position as to prevent, as far as is practicable, accidental displacement.

4.2 No scaffold or part of a scaffold shall be partly dismantled and remain in such a condition that it is capable of being used unless either:

- a) the scaffold continues to comply and would, if used, comply with these regulations; or
- b) if the scaffold or part thereof would, if used, not comply with these regulations, a prominent warning notice indicating that the scaffold or part thereof is not to be used, is affixed near any point at which the scaffold or part, as the case may be, is liable to be approached for the purpose of use.

5. INSPECTION OF SCAFFOLDS

5.1 Subject to provisions of this regulation no scaffold shall be used unless:

- a) it has been inspected by a qualified and authorised safety engineer before using;

- b) it has been inspected by a qualified and authorised safety engineer within the immediately preceding seven days;
- c) it has been inspected by a qualified and authorised safety engineer since exposure to weather conditions likely to have affected its stability or to have displaced any part; and
- d) a report of the results of any such inspection certifying that the scaffold is suitable for use signed by the person making the inspection has been entered into a register to be kept at the worksite.

5.2 The requirement of **5.1** (a) and (b) shall not apply in the case of a scaffold no part of which has been erected for more than seven days, and **5.1** (d) shall not apply to a ladder scaffold, a trestle scaffold or a scaffold from no part of which a person is liable to fall more than 2.0 m.

5.3 The requirements of **5.1** shall not require a scaffold to be inspected by reason only that it has been added to, altered or partly dismantled.

6. SCAFFOLDS USED BY WORKMEN OF MORE THAN ONE EMPLOYER

6.1 Where a scaffold or part of a scaffold is to be used by or on behalf of any employer other than the employer for whose workmen it was first erected, the first mentioned employer shall, before such use, and without prejudice to any other obligations imposed upon him by these regulations, take express steps, either personally or by a competent agent, to satisfy himself that the scaffold or part thereof is stable, that the materials used in its construction are sound and that the safeguards required by these regulations are in position.

7. SUPPORT AND STABILITY OF SCAFFOLDS

7.1 The displacement of the foot of any standard or upright shall, unless prevented in some other sufficient way, be prevented either

- a) by sinking the standard or upright a sufficient distance into ground; or
- b) by placing the standard or upright on an adequate base plate on top of timber sole plate in some cases in a manner to prevent slipping or sinking.

7.2 Every scaffold shall be securely supported or suspended and shall where necessary be sufficiently and properly strutted or braced to ensure stability and, unless it is properly designed and constructed as an independent scaffold, shall be rigidly connected with the building.

7.3 All structures and appliances used as supports for scaffolds, working platforms, gangways or ramps shall be of sound construction, have a firm footing or be firmly supported, and shall where necessary be sufficiently and properly strutted or braced to ensure stability.

7.4 Any travelling scaffold which may be moved on wheels or skids shall, unless it is a suspended or slung scaffolds, shall be:

- a) constructed with due regard to stability, and, if necessary for stability, adequately weighted at the base;
- b) used only on a firm and even surface, not so sloping as to involve risk of instability of the scaffold or any load thereon;
- c) adequately secured to prevent movement when any person is working upon it; and
- d) moved only by the application of a force at or near the base without overturning.

7.5 Loose bricks, drain pipes, chimney pots or other unsuitable material shall not be used for the construction or support of scaffolds save that bricks or small blocks may, if they provide a firm support, be used to support a platform not more than 0.5 m above the ground or floor.

7.6 No part of a building shall be used as support for part of a scaffold unless it is of sound material and sufficiently stable and of sufficient strength to afford safe support. Overhanging eaves, gutters shall not be used as such supports unless they have been specially designed as walkways and are of adequate strength.

8. CANTILEVER, JIB, FIGURE AND BRACKET SCAFFOLDS, ETC

8.1 No cantilever or jib scaffold shall be used unless it is adequately supported, fixed and anchored on the opposite side of the support, has outriggers of adequate length and cross-section and is where necessary sufficiently and properly strutted or braced to ensure rigidity and stability.

8.2 No working platform resting on bearers let into a wall at one end and without other support shall be used unless the bearers are of adequate strength, pass through the wall and are securely fastened on the other side.

9. TRESTLE SCAFFOLDS

9.1 No trestle scaffold shall be used:

- a) if constructed with more than three tiers; or
- b) if it has working platform more than 4.50 m above the ground or floor or other surface upon which the scaffold is erected.

9.2 No trestle scaffold shall be erected on a scaffold platform unless:

- a) the width of the platform is such as to leave sufficient clear space for the transport of materials; and
- b) the trestles or uprights are firmly attached to the platform and adequately braced to prevent displacement.

9.3 No trestle scaffold shall be erected on a suspended scaffold.

9.4 No figure or bracket scaffold supported or held by dogs, spikes or similar fixings liable to pull out of the stonework or brickwork in which they are gripped or fixed shall be used.

10. WORKING PLATFORMS (INCLUDING WORKING STAGES)

10.1 Every working platform from which a person is liable to fall more than 2.0 m shall be:

- a) closely boarded, planked, or plated;
- b) at least 700 mm wide if the platform is used as a footing only and not for the deposit of any material;
- c) at least 900 mm wide if the platform is used for the deposit of material;
- d) at least 1 100 mm wide if the platform is used for the support of any higher platform;
- e) at least 1 300 mm wide if the platform is one upon which stone is dressed or roughly shaped; and
- f) at least 1 500 mm wide if the platform is used for the support of any higher platform and is one upon which stone is dressed or roughly shaped.

10.2 Requirement of 10.1 (a) shall not apply to a platform consisting of open metalwork having interstices none of which exceeds 40 cm² in area, if there is no risk of persons below such platform being struck by tools or other object falling through the platform.

10.3 Requirement of 10.1 (a) shall not apply to a platform which is part of the permanent fixed equipment of a building and the boards, planks or plates of which are so secured as to prevent their moving and so placed that the space between adjacent boards, planks or plates does not exceed 25 mm, if there is no risk of persons below such platform being struck by tools or other objects falling through the platform.

10.4 Requirements of 10.1 (b) to (f) shall not apply to a working platform which is at least 500 mm wide, and is on the outside of any sloping roof.

10.5 Requirements of **10.1** (b) and (c) shall not apply in the case of the platform of a suspended scaffold, or in the case of a platform not less than 500 mm wide being the platform of a ladder scaffold or of a trestle scaffold or being a platform under a roof which is supported by or suspended from roof members or the roof and which is used only by painters for the purpose of painting work in the vicinity of the roof, where in any such case the work is of such a light nature and the material required for the work is such that a platform less than 700 or 900 mm wide, as the case may be, can be used with safety, and the platform is not used for the support of any higher platform.

10.6 Requirements of **10.1** (b) and (c) shall not apply in the case of a temporary platform not less than 500 mm wide passing between two adjacent glazing bars of a sloping roof if the space between those bars does not admit of the platform being at least 700 mm wide and if the platform is used only for work in the vicinity of those bars.

11. BOARDS AND PLANKS IN WORKING PLATFORMS, GANGWAYS AND RAMPS

11.1 Every board or plank forming part of a platform or used as a toe board shall be:

- a) of a thickness (minimum 32 mm) which is such as to afford adequate security having regard to the distance between the transoms, putlogs, board bearers or standards; and
- b) not less than 200 mm wide or in the case of boards or planks exceeding 50 mm in thickness, not less than 150 mm wide.

11.2 The distance between two consecutive transoms, putlogs, board bearers or other supports on which a platform rests shall be fixed with due regard to the anticipated load and the nature of platform flooring. As a general rule the distance with single planking shall not exceed 1 000 mm with planks 32 mm in thickness, 1 500 mm with planks 38 mm in thickness, or 2 600 mm with planks 50 mm in thickness.

11.3 No board or plank which forms part of a working platform, gangway or ramp shall project beyond its end support to a distance exceeding four times the thickness of the board or plank unless it is effectively secured to prevent tipping, or to a distance which, having regard to the thickness and strength of the plank renders the projecting part of the plank an unsafe support for any weight liable to be upon it.

11.4 At the joints, boards generally should be butted, but lapping is permissible if bevelled pieces of wood are fitted, or other suitable measures taken to minimise the risk of tripping.

11.4.1 Suitable measures such as the provision of adequate bevelled pieces shall be taken to reduce to a minimum the risk of tripping and to

facilitate the movement of barrows where boards or planks which form part of a working platform, gangway or run overlap each other or are not of reasonably uniform thickness where they meet each other or owing to warping or for some other reason do not provide an even surface.

11.5 Every board or plank which forms part of a working platform shall:

- a) rest securely and evenly on its supports, and
- b) rest on at least three supports unless, taking into account the distance between the supports and the thickness of the board or plank, the conditions are such as to prevent undue sagging.

11.6 Where work has to be done at the end of a wall the working platform at such wall shall, wherever practicable, extend at least 600 mm beyond the end of the wall.

12. GUARD-RAILS AND TOE-BOARD AT WORKING PLACES

12.1 Every side of a working platform or working place, being a side thereof from which a person is liable to fall, a distance of more than 2 m shall be provided one or more suitable guard-rail on guard-rails of adequate strength, to a height of at least 900 mm (but maximum 1 200 mm) above the platform or place and above any raised standing place on the platform, and with toe-boards up to a sufficient height being in no case less than 150 mm and so placed as to prevent so far as possible the fall of persons, materials and tools from such platform or place.

12.2 The guard-rails and toe-boards used on a working platform or working place shall be placed on the inside of the uprights, and the space between any toe-board and the lowest guard-rail above it shall not exceed 750 mm.

12.3 Guard-rails and toe-boards required by **12.1** and **12.2** may be removed or remain unerected for the time being and to the extent necessary for the access of persons or the movement of materials.

12.4 The requirements of **12.1** and **12.2**, shall not apply to a platform provided with suitable guard-rails which is on the outside of a sloping roof.

12.5 The requirements of **12.1** and **12.2** shall not apply to a temporary platform which is used only by erectors of structural steelwork for the purposes of bolting up, riveting or welding work of such short duration as to make the provision of a platform with guard-rails and toe-boards unreasonable if:

- a) the platform is at least 900 mm wide,
- b) there is adequate handhold, and

- c) the platform is not used for the deposit of tools or materials otherwise than in boxes or receptacles suitable to prevent the fall of the tools or materials from the platform.

12.6 The requirements of **12.1** and **12.2** shall not apply to a temporary platform passing between two adjacent glazing bars of a sloping roof if those bars or the roof framework afford secure handhold for the full length of the platform, and the requirements of toe-boards as specified in clauses under **12** shall not apply as respects such platform where and is so far as the provision of a toe-board is impracticable on account of the nature or circumstances of the work.

12.7 The requirements of **12.1** and **12.2** shall not apply to a platform under a roof which is supported by or suspended from roof members or the roof and which is used only by painters for the purpose of painting work in the immediate vicinity of the roof, being work of such short duration as to make the provision of a platform with guard-rails and toe-boards unreasonable, if:

- a) there is adequate handhold at every working position, and
- b) the material required for the work is such that the platform can be used with safety.

13. WORKING PLATFORM AT BUILDING FACE AND CLEARANCE OF PASSAGE WAYS

13.1 Where work at the face of a building is done from a working platform the space between the face of the building and the working platform shall be as small as practicable so that where workmen sit at the edge of the platform to work the space shall not exceed 300 mm.

13.2 A clear passage way of at least 500 mm wide shall be left between one side of any working platform and any fixed obstruction or deposited material.

14. CONSTRUCTION AND USE OF GANGWAYS AND RAMPS

14.1 Every gangway or ramp from any part of which a person is liable to fall, a distance of more than 2 m shall:

- a) be closely boarded, planked or plated; and
- b) be at least 500 mm wide.

14.2 The requirement of **14.1** (a) shall not apply:

- a) to a gangway or ramp consisting of open metalwork having interstices none of which exceeds 40 cm² in area, if there is no risk of persons below such gangway or ramp being struck by tools or other objects falling through the gangway or ramp; or

- b) to a gangway or ramp which is part of the permanent fixed equipment of a building and the boards, plates or planks of which are so secured as to prevent their moving and so placed that the space between adjacent boards, planks or plates does not exceed 25 mm, if there is no risk of persons below such gangway or ramp being struck by tools or other objects falling through the gangway or ramp.

14.3 No gangway, ramp or working platform shall be used for the passage of materials unless it affords a clear passage way which is adequate in width for the passage of the materials without removal of the guard-rails and toe-boards and in any case is not less than 700 mm wide.

14.4 All planks forming a gangway or ramp shall be so fixed and supported as to prevent undue or unequal sagging.

14.5 No gangway or ramp shall be used, the slope of which exceeds 1 vertical to 1.5 horizontal.

14.6 Where the slope of gangway or ramp renders additional footholes necessary and in every case where the slope is more than 1 vertical to 4 horizontal, there shall be provided proper stepping laths which shall:

- a) be placed at suitable intervals, maximum 500 mm apart; and
- b) be the full width of the gangway or ramps, except that they may be interrupted over a width of not more than 100 mm to facilitate the movement of barrows.

14.7 Ramps may have a continuous length maximum 7 m without landing.

15. GUARD-RAILS, TOE-BOARDS, HAND-RAILS, ETC, FOR GANGWAYS, RAMPS AND STAIRS

15.1 Stairs shall be provided throughout their length with hand-rails or other efficient means to prevent the fall of persons except for the time and to the extent necessary for the access of persons or the movement of materials. If necessary to prevent danger to any person the hand-rails shall be extended minimum 1.0 m beyond the ends of the stairs.

15.2 All gangways, ramps and stairs from which a person is liable to fall a distance of more than 2 m shall be provided with:

- a) suitable guard-rails of adequate strength to a height of at least 900 mm (but maximum 1 200 mm) above the gangway, ramp or stair; and
- b) except in the case of stairs, toe-boards up to a sufficient height being in no case less than 200 mm and so placed as to prevent as far as possible the fall of persons, materials and tools. The

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space between any such toe-board and the lowest guard-rail above it shall not exceed 700 mm.

15.3 The requirements of **15.2** shall not apply to a temporary gangway which is used only by erectors of structural steelwork for the purposes of bolting up, riveting or welding work of such short duration as to make the provision of a gangway with guard-rails and toe-boards unreasonable.

16. PLATFORMS, GANGWAYS, ETC, TO BE UNOBSTRUCTED AND TO AFFORD SAFE Foothold

16.1 Every platform, gangway, ramp or stair shall be kept free from any unnecessary obstruction, material or rubbish and from any projecting nails.

16.2 If a platform, gangway, ramp or stair becomes slippery, appropriate steps shall as soon as reasonably practicable be taken by way of sending, cleaning or otherwise to remedy the defect.

17. SCAFFOLDS NOT TO BE OVERLOADED

17.1 Scaffolds shall not be overloaded and materials shall not be kept upon them unless needed for work within a reasonable time.

18. AVOIDANCE OF SHOCK ON SCAFFOLDS

18.1 When any material is transferred on or to a scaffold it shall be moved or deposited without imposing any violent shock.

19. PROJECTING NAILS AND LOOSE MATERIALS

19.1 No timber or material with projecting nails shall be used in any work in which they are a source of danger to persons employed or be allowed to remain in any place where they are a source of danger to such persons.

19.2 Loose materials where not required for use shall not be placed or left so as to impede the passage of persons upon platforms, gangways, floors, or other places on the site used for such passage, but shall be removed, stacked or stored so as to leave such places free from obstruction. Materials shall not be insecurely stacked in a place where they may be dangerous to persons employed, or so stacked as to overload and render unsafe any floor, roof or other part of a building.

20. LIGHTING OF WORKING PLACES

20.1 Every working place and approach thereto, every place where raising or lowering operations with the use of a lifting appliance are in

progress, and all openings dangerous to persons employed, shall be adequately and suitably lighted.

21. ELECTRICAL WIRING

21.1 The setting up of a scaffold near unprotected current carrying wires or equipment, or insulated wires and equipment shall be started only when the lines have been disconnected. The wiring shall be disconnected by skilled persons or protected against accidental contact. After the erection of scaffold the wires may be made to carry the current only when sufficient safety measures have been adopted to avoid accidental contact.

22. SCAFFOLDS AND TRAFFIC

22.1 During the setting up and dismantling of scaffolds, warning signs, safety cardons and other safety measures shall be provided to ensure safety for the traffic.

22.2 Scaffolds shall be protected against accidental collisions with the traffic. A clear height of 2.5 m shall be maintained over pedestrain traffic areas. Up to a height of 4.5 m, all parts of the scaffolds shall remain at least 0.8 m behind the front edge of the curb.

22.3 Scaffolds built over street pavement shall preferably have a through passage for the pedestrians the clear height of the passage being minimum 2.5 m. The roof of the passage should be closely boarded or suitably covered with roofing sheets, tarpaulin or other materials as protection from falling materials.

22.4 Scaffolds on throughfares shall be provided with light if the streeet light is not sufficient to make it clearly visible.

22.5 Access to fire alarms, cable tunnels, hydrants, etc, shall remain free at all times. Care should be taken for underground cables and equipment also. This is specially important when parts of scaffolds or other fasteners have to be driven in the ground.

22.6 Trees and street poles shall be cordoned, so that they are not damaged.

23. PROTECTION FROM FALLING MATERIALS AND PROTECTION OF WORKERS FROM FALLING DOWN

23.1 Any place on the site of the operations at which any person is habitually employed shall be covered in such manner as to protect any person who is working in that place from being struck by falling materials or article.

23.2 Scaffold materials, tools and other objects and materials (including waste materials) shall not be thrown, tipped or shot down from a height where they are liable to cause injury, but shall be properly lowered; in any place where proper lowering is not practicable and also where any part of a structure is being demolished or broken off adequate shall be taken, where necessary, to protect persons employed from falling or flying debris.

23.3 When the work is done above an open space at a height of more than 5.0 m, catching scaffold shall be set up to protect these working on floors or roofs against falling down, and also to stop building materials and tools from falling. Depending on the conditions these may be set up as independent scaffolds, cantilever scaffold, suspended scaffold or mobile scaffold. Further, these may be built up by laying scaffolds boards on beams or rafters of the structure under construction or by attaching the boards to room trusses, crane rails or similar structural members.

23.3.1 When building with precast concrete parts of setting up wooden or steel structures which are already tied up for assembly and it is not possible to fix a catching scaffold or a catching net, it is necessary that only such workers are employed who have experience in this kind of work.

23.3.2 The width of the catching scaffold shall depend on the height from the scaffold covering to the place of work and generally be as follows:

Height up to	2.0 m	3.0 m	4.0 m
Minimum width	1.0 m	1.3 m	1.8 m

23.4 For the purpose of only preventing workers falling down, instead of catching scaffold a catching net or strong fabric or individual person safety belt may be used if it can be fixed and secured perfectly. The traffic below the catching nets, etc, shall be stopped as safety measure against building materials falling through.

23.5 When working on pavement, street or driveway, to avoid disturbance of traffic unnecessarily by dust or mortar, scaffolds should be covered at the sides by protection coverings, for example, timber plank, tarpaulin, cloth or roofing sheets. For working on gables which are not directly above traffic and on the courtyard side, it is sufficient to block the ways.

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* Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	{ 331 13 75 37 86 62
Northern	: SCO 445-446, Sector 35-C, CHANDIGARH 160036	2 18 43
Southern	: C.I.T. Campus, IV Cross Road, MADRAS 600113	41 29 16
† Western	: Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95

Branch Offices :

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	2 63 48
‡ Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	39 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
Kalai Kathir Building, 6/48-A Avanasai Road, COIMBATORE 641037	2 67 05
Quality Marking Centre, N.H. IV, N.I.T., FARIDABAD 121001	—
Savitri Complex, 116 G. T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	3 31 77
6-8-56C L. N. Gupta Marg, (Nampally Station Road) HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	6 34 71
117/418 B Sarvodaya Nagar, KANPUR 208005	21 68 76
Plot No. A-9, House No. 561/63, Sindhu Nagar, Kanpur Road, LUCKNOW 226005	5 55 07
Patliputra Industrial Estate, PATNA 800013	6 23 05
District Industries Centre Complex, Bagh-e-Ali Maidan, SRINAGAR 190011	—
T. C. No. 14/1421, University P. O., Palayam, THIRUVANANTHAPURAM 695034	6 21 04
<i>Inspection Offices (With Sale Point) :</i>	
Pushpanjali, First Floor, 205-A West High Court Road, Shankar Nagar Square, NAGPUR 440010	52 51 71
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	5 24 35
*Sales Office Calcutta is at 5 Chowringhee Approach, P. O. Princep Street, CALCUTTA	27 68 00
† Sales Office is at Novelty Chambers, Grant Road, BOMBAY	89 65 28
‡ Sales Office is at Unity Building, Narasimharaja Square, BANGALORE	22 39 71

Reprography Unit, BIS, New Delhi, India